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STATUS REPORT

D. Ralph Rusk
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X
A Field Ion Microscope Facility for
Solid State and Surface Studies

OTS PRICE

XEROX

\$ 1.10 ph.

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Two major experimental results have emerged from field ion microscopy studies in the period covered by this report. The first of these is concerned with precipitates in carbon doped tungsten and the second with the nature of radiation damage in irradiated platinum. While no detailed analysis of these results will be presented here some of the more pertinent findings will be summarized.

In tungsten charged with carbon and quenched from approximately 1800°C, coherent precipitates have been observed, (fig. 1). They lie along (100) planes and vary in thickness from about 1 atomic layer to four to five atomic layers as determined by field evaporation experiments. These precipitates persist throughout the evaporation, so that no information is available on average length of these precipitates, but they could be larger than 300Å.

It is also observed that one can distinctly "see" through these precipitates, i.e., the net planes of the matrix are observed to be continuous and observable within the region of the precipitate. This indicates that the precipitate is coherent.

Observations have also been made on room temperature neutron irradiated platinum, where both collections of interstitials and vacancies have been detected. From the observed

shapes the interstitials are thought to be in the form of tetrahedra, while the vacancies are in the form of plates. A radioactive analysis revealed no major impurities which could account for the results. In addition, stacking faults have been observed.

These encouraging results have pointed to many other experiments, which are being evaluated. The results mentioned above will soon be complete enough for submission for publication.

The ultra high vacuum microscope is not yet functioning in that vacuum leaks still exist. It is hoped to have this unit in operation when the leaks are eliminated.

